July 28, 2000

D.T.E. 98-86

Petition of Bay State Gas Company , pursuant to G.L. c. 164, §69I, for approval by the Department of Telecommunications and Energy of its Long-Range Forecast and Supply Plan for the period 1998 through 2003.

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I. INTRODUCTION AND PROCEDURAL HISTORY

On August 14, 1998, pursuant to G.L. c. 164, § 69I, Bay State Gas Company ("Bay State" or "Company") filed with the Department of Telecommunications and Energy ("Department") a petition for approval of its long-range forecast and resource plan for the period of November 1, 1998 through October 31, 2003. The petition was docketed as

D.T.E. 98-86.

The Attorney General of the Commonwealth intervened as of right pursuant to

G.L. c. 12, § 11E. The Department granted the petition to intervene of the Commonwealth's Division of Energy Resources.

Bay State is a local distribution company ("LDC") serving approximately 261,000 residential, commercial, and industrial customers in Massachusetts.

Pursuant to notice duly issued, the Department conducted a public hearing and procedural conference in Boston on December 16, 1998. An evidentiary hearing was held at the Department's offices on March 9, 1999. Bay State Gas presented three witnesses in support of its Forecast and Supply Plan: Stanley M. Dziura, Jr., manager of energy demand and supply planning; Francisco DaFonte, director of gas control; and Christopher A. Kahl, supply planning analyst. The evidentiary record consisting of the Company's Report on its proposed Forecast and Supply Plan, standard schedules, an econometric supply forecast, relevant supporting data and workpapers, as well as the Company's responses to Department information and record requests.

II. ANALYSIS OF THE LONG-RANGE FORECAST

A. Standard of Review

Pursuant to G.L. c. 164, § 69I, the Department is required to ensure "a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost." In accordance with this mandate, the Department reviews the long range forecast of each gas utility to ensure that the forecast accurately projects the gas sendout requirements of the utility's market area. G.L. c. 164, § 69I. A forecast must reflect accurate and complete historical data, and reasonable statistical projection methods. G.L. c. 164,

§ 69I; 980 C.M.R. § 7.02 (9)(b). Such a forecast should provide a sound basis for resource planning decisions. Colonial Gas Company, D.P.U. 96-18, at 4 (1996); Bay State Gas Company, D.P.U. 93-129, at 5 (1996); Holyoke Gas and Electric Department, D.P.U. 93-191, at 2 (1996); Berkshire Gas Company, 16 DOMSC 53, at 56 (1987).

In its review of a forecast, the Department determines if a projection method is reasonable based on whether the methodology is: (a) reviewable, that is, contains enough information to allow a full understanding of the forecast methodology; (b) appropriate, that is, technically suitable to the size and nature of the particular gas company; and (c) reliable, that is, provides a measure of confidence that the gas company's assumptions, judgments, and data will forecast what is most likely to occur. D.P.U. 96-18, at 5; D.P.U. 93-129, at 5; D.P.U. 93-191, at 2; Haverhill Gas Company, 8 DOMSC 48, at 50-51 (1982). Specifically, the Department examines a gas company's: (1) planning standards, including its weather data;

(2) forecast method, including the forecast results; and (3) derivation and results of its design and normal sendout forecasts. See D.P.U. 96-18, at 5 and D.P.U. 93-129, at 5-6; D.P.U. 93-13, at 6; see also, Boston Gas Company, D.P.U. 94-109 (Phase 1), at 9 (1996). As part of the review of the forecast, the Department also examines the company's scenario analysis, which is used for evaluating the flexibility of the company's planning process, including any cold-snap analysis[(1)] and sensitivity analysis. Boston Gas Company, 25 DOMSC 116, at 200 (1992) ("1992 Boston Gas Decision"); see D.P.U. 93-129, at 23-25 and D.P.U. 94-109

(Phase 1), at 61-66.

B. Previous Sendout Forecast Review

In Bay State Gas Company, D.P.U. 93-129, at 25 (1996) ("DPU 93-129"), the Department approved Bay State's send out forecast, subject to several conditions. Specifically, the Company was directed to (1) indicate how they forecast daily estimates (e.g., the process, the model, and the relevant variables); and (2) compare estimated and actual daily sendout for an established period of time.

C. Planning Standards

The first element of the Department's forecast review is an assessment of a company's planning standards to determine if they are reviewable, appropriate and reliable. A company's planning standards are used as a basis for projecting its sendout forecast which, in turn, is used for ascertaining the adequacy and cost of a company's supply plan.

To ascertain the adequacy of a company's forecast, the Department initially conducts a review of the company's weather data. Then, the Department focuses on the planning standards themselves, i.e., how the company arrived at its (1) normal year, (2) design year, and (3) design day standards.

1. Weather Data

a. Description

The Company stated that it purchased its weather data on a daily basis from Weather Services Corporation, Inc.("WSC") (Exh. BSG-1, at 29). WSC provided the Company with division-specific effective degree day ("EDD") weather data from 1967 through 1997 (id. at 30).

b. Analysis and Findings

In its previous filing, Bay State used a 20-year rolling, historical database to develop its planning standards (D.P.U. 93-129, at 6). In the instant filing, the Company extended the data set of EDDs used in its design standard analysis from 20 years to 31 years for each of the Company's three divisions. The Department has previously approved of the WSC weather database as appropriate for input into the planning standards of other Massachusetts LDCs (See Colonial Gas Company, D.P.U. 96-18, (1996); Commonwealth Gas Company, D.T.E./D.P.U. 96-117, (2000).

The Department notes that the 31 years of weather data collected by the Company is an improvement of Bay State's data base over its previous filing and likely to lead to more accurate forecasting. Therefore, the Department finds the weather database used by the Company in this filing is appropriate, reviewable and reliable.

2. Normal-Year Standard

a. Description

To develop its sendout forecast, Bay State used a normal-year standard of 6,910 EDD for the Brockton Division, 6,785 EDD for the Springfield Division, and 7,283 EDD for the Lawrence Division (Exh. BSG-1, Schedule BSG-III-15). To derive the normal-year standard, the Company calculated the arithmetic mean of EDDs in each month using the 31-year data and then summed these mean monthly EDDs by division (id. at 30).

b. Analysis and Findings

Bay State's use of the arithmetic average of historical degree day data to establish a normal-year standard has previously been accepted by the Department. 1992 Boston Gas Decision at 136; 1991 Colonial Gas Decision, 23 DOMSC 351, at 363-364 (1991). Because Bay State bases its normal-year standard on the historical average of the actual data and its planning standards on the weather database approved in Section II(C)(1)(b) above, the Department finds that Bay State's method for determining its normal-year standard is reviewable, appropriate, and reliable.

3. Design-Day Standard

- Description

In developing its design-day standard, the Company indicated that it continues to use the probability of occurrence standard of 1 in 25 years, as approved by the Department in D.P.U. 93-129 (Exh. BSG-1, at 30). Bay State argues that the standard is still acceptable and implies that a higher actual design-day condition can be met because the system is designed to allow for future growth and, therefore, any excess can be used for backup purposes (id.). Further, the Company states that EDDs, at or near design requirements, may be overstated because of a "bend over" effect[(2)] and, therefore, capacity requirements may be less at the highest EDDs (id.; Tr. at 15).

To develop its design-day standard, Bay State calculated a normal or mean coldest day between 1967 and 1997 for each division (id.). The Company used a probability distribution for its weather data and selected a design-day standard of 1 in 25 years (id. at 30-31).

Bay State calculated a design-day standard of 78 EDD for the Brockton Division, 77 EDD for the Springfield Division and 78 EDD for the Lawrence Division, and used these figures to develop its sendout forecast (id. at Schedule BSG-III-15).

b. Analysis and Findings

The Department reviews design criteria to ensure that there is a reasonable relationship between forecasted and actual conditions. See Gas Generic Order, 14 DOMSC 95, at 97 (1986). Specifically, the Department evaluates how and why a company selects particular design weather criteria and the effect that the design standard has on the reliability of a company's forecast and the cost of its supply plan. Id. at 96-97, 104-105.

In D.P.U. 93-129, the Department approved Bay State's design-day standard. The Department notes that the conditions leading to approval of the Company's design-year standard have not changed since the Company's last forecast and supply plan, and finds that the Company's method for obtaining its design-day standards is reviewable, appropriate and reliable.

4. Design-Year Standard

a. Description

The Company followed a similar method to its design-day standard for determining its design-year standard (Exh. BSG-1, at 31). Bay State calculated a normal or mean winter season for the period between 1967 and 1997 (id.). The Company used a probability distribution for its weather data and selected a design winter standard of 1 in 25 years (id.).

Bay State calculated a design-year standard of 7,413 EDD for the Brockton Division, 7,245 EDD for the Springfield Division, and 7,781 EDD for the Lawrence Division, and used those figures to develop its sendout forecast (id., at Schedule BSG-III-15).

b. Analysis and Findings

The Company's method for calculating design-year standard is identical to the method used in its design-day standard. As we found with the design-day standard, the conditions leading to the approval of the Company's design-year standard have not changed since we approved Bay State's last forecast and supply plan. Therefore, the Department finds that, once again, the Company's method for obtaining its design-year standard is reviewable, appropriate and reliable.

D. Forecasting Methods

1. Residential, Commercial & Industrial Forecast

a. Description

The Company's current forecast of firm gas sendout was developed using the residential and commercial and industrial ("C&I") customer classes (Exh. BSG-1, at 14). Bay State modeled "total throughput" and "number of meters" for the large C&I customers and "use per meter" and "number of meters" for residential and small C&I customers (id.). The throughput forecast for the residential and small C&I customers was calculated as the product of two separate forecasts: one forecast estimated the use per active meter; and, the other estimated the number of customers (id. at 16). The Company derived these forecast results for each of its three divisions (id. at 14). Bay State used quarterly data between between 1983 and 1997 for the number of active meters, MMBtu sales, and revenues (id. at at 15). Additionally, Bay State purchased actual and forecasted values of the economic and demographic variables from DRI/McGraw-Hill (id.).

Bay State's forecast model results were presented under three scenarios: base case, high and low (id.). The Company claimed that over the five-year forecast period, the base case throughput is estimated to increase by approximately 5.8 million MMBtu, for an average annual growth rate of 2.5 percent (id. at 24). Bay State's historical growth rate for normalized throughput has been about 13 percent for the previous planning period 1993-1998 (id.). The Company projects that the number of meters will increase by 12 percent between 1998 and 2003 (id.). The Company's projections for meters and throughput

growth rates are similar, and range between 2.3 to 2.5 percent, on average, in the base and low cases (id.). Furthermore, the Company stated that in the high case scenario, while the average annual growth in throughput is 4.2 percent, the growth rate in meters is 3.1 percent (id. at 24-25).[(3)]

In its forecast, Bay State included projected demand side management ("DSM") savings (id. at 21). Specifically, the Company included DSM as a line item in the low scenario throughput forecast, and did not reduce the base and high forecast throughput as a result of DSM savings (id.).

The Company employed "prime interest rate" with selected time lags to explain the following dependent variables: non-heat C&I meters; heating C&I meters; non-heat C&I demand; and, heating C&I demand for each division (id. at Schedule BSG-III-2). The Company stated that it used these variables as an indicator of the general economy (e.g., level of economic activity) (Tr. at 23-24). The Company also argued that these variables performed better statistically in explaining the number of meters and demand when compared to other variables (id. at 24).

b. Analysis and Findings

The Department notes that Bay State's integration of a regression analysis with a time-series model to develop a long-range demand forecast model is a sophisticated procedure. However, the Department cautions the Company that its choice of variables throughout the models and the low Durbin-Watson statistics for most of the regression equations may undermine its forecasting results.

Moreover, the Department notes that relying only on statistical results does not sufficiently contribute to the explanatory power of a model. Other explanatory variables, such as the index for manufacturing production or income growth, could better explain the dependent variables, since they are supported by a strong theoretical basis.

Further, the low Durbin-Watson statistics indicate a serial correlation (or autocorrelation) in OLS procedure. These will yield inefficient estimators (i.e., lacking minimum variance) and the resulting t and F tests are likely to give misleading conclusions since the variances and the standard errors of the OLS estimators are likely to underestimate the true variances and standard errors.[(4)]

On the other hand, Bay State's sensitivity analysis based on varying assumptions of economic and demographic developments helps the Company to obtain a more flexible forecast. As a result of this sensitivity analysis, the Company is able to evaluate a larger spectrum of possible demand realizations.

Consequently, the Department finds the Company's forecast method and level of technical sophistication in its estimation procedure to be appropriate and reviewable. However, the Department finds Bay State's forecast minimally reliable due to the low

Durbin-Watson statistics which point to positive serial correlation. In its next filing, the Company is directed to provide forecasts using a stronger statistical analysis.

2. Transportation Forecasts

a. Description

In addition to developing two different throughput forecast scenarios based on economic and demographic developments, the Company developed a second set of sensitivity analyses based on low and high migration to transportation services (Exh. BSG-1, at 13). The Company stated that the throughput scenarios (i.e., base, low and high) begin with the assumption that there will be a ten percent migration per year, over and above the level of transportation service that existed as of December, 1997 (id. at 12). To increase the bandwidth for merchant function requirements, the Company used a high throughput case to develop the low transportation migration sensitivity case and used a low throughput case to develop the high transportation migration sensitivity case (Tr. at 12-13).

Bay State's transportation forecast projects a 14 percent increase (1,022 BBtu) over the forecast period under the low migration (design-year) scenario (Exh. BSG-1, at Schedule BSG V-12). The Company forecast a 31,777 BBtu (177 percent) increase during the same period under high migration (design-year) scenario (id.).

b. Analysis and Findings

The Department notes that the Company's sensitivity analyses with regard to future customer migration levels together with its throughput scenarios allow Bay State to enhance its resource planning by creating a flexible throughput forecast interval. However, the Company developed its transportation forecast results by simply relying on assumptions regarding the percentage of customers expected to migrate to transportation service. Bay State did not justify its assumptions regarding expected future migration ratios. The Department cautions Bay State that as the gas marketplace becomes more competitive, the accuracy of Bay State's transportation forecast will become increasingly important in terms of its capacity and resource planning.

Because of the insufficient amount of data, the Department finds Bay State's transportation migration forecast to be reviewable, but minimally appropriate and minimally reliable. As a requirement for approval of its next transportation migration forecast, Bay State is directed to develop a modeling framework for its migration forecast and to justify fully its assumptions.

3. Normal-and Design-Year Sendout Forecast

a. Description

The econometric process developed by the Company directly yields the demand forecast (Exh. BSG-1, at 26). Bay State forecasted that total firm sendout will decrease by 16,658 BBtu (or 49.5 percent) under normal conditions between the 1998-99 and 2002-03 heating seasons due to increased migration to transportation service (id. at Schedule BSG-V-16).[(5)]

The Company converted its firm sendout forecast into daily base load and heat sensitive load per degree day factors (id. at 26-28). In this process, the Company defined base load as the average sendout for July and August (id. at 28). The Company defined the temperature sensitive load as the difference between total load and base load (id.). Bay State used degree day factors for scaling the forecast to the Company's normal and design conditions (id.). The Company's base case design-year firm sendout is projected to decrease by 17,570 BBtu (or 49.6 percent) between 1998-99 and 2002-03 (id. at Schedule BSG-V-4).

b. Analysis and Findings

The Company appropriately adjusted total sales numbers for unaccounted for gas to obtain its sendout forecast. Bay State also calculated separate forecasts for normal and design conditions based on the planning standards approved by the Department in Section II(2)(b).

The Department notes that Bay State's approach in determining normal- and design-year sendout is in accordance with Department precedent (See Commonwealth Gas Company, 96-117, (2000); Colonial Gas Company, D.P.U. 96-18, (1996)). Therefore, the Department finds that the normal- and design-year sendout forecasts are reviewable, reliable and appropriate.

4. Design-Day Sendout Forecast

a. Description

The Company forecasted its design-day sendout in a manner similar to the design-year sendout forecast (Exh. BSG-1, at 26). The Company's design-day sendout forecast yielded a 39.5 BBtu increase over the planning period which indicated a 9.1 percent growth between 1998-99 and 2002-03 (id. at Schedule BSG-V-15).

b. Analysis and Findings

For its design-day, the Company used a similar analysis to those for normal and design year. Consistent with the analysis and findings provided in Section II(D)(3), the Department finds that the Company's design-day sendout forecasts are reviewable, reliable and appropriate.

III. ANALYSIS OF THE SUPPLY PLAN

A. Standard of Review

The Department is required to ensure "a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost." G.L. c. 164, § 69I. In fulfilling this mandate, the Department reviews a gas company's supply planning process and the two major aspects of every utility's supply plan -- adequacy and cost.[(6)] Commonwealth Gas Company, D.P.U. 92-159, at 53; Colonial Gas Company, D.P.U. 93-13, at 49-50; 1992 Boston Gas Decision, 25 DOMSC at 201.

The Department reviews a gas company's five-year supply plan to determine whether the plan is adequate to meet projected normal year, design year, design day, and cold-snap firm sendout requirements.[(7)] In order to establish adequacy, a gas company must demonstrate that it has an identified set of resources that meet its projected sendout under a reasonable range of contingencies. If a company cannot establish that it has an identified set of resources which meet sendout requirements under a reasonable set of contingencies, the company must then demonstrate that it has an action plan which meets projected sendout in the event that the identified resources will not be available when expected. Colonial Gas Company, D.P.U.

96-18, at 31; Commonwealth Gas Company, D.P.U. 92-159, at 54; Colonial Gas Company, D.P.U. 93-13, at 50.

In its review of a gas company's supply plan, the Department reviews a company's overall supply planning process. An appropriate supply planning process is essential to the development of an adequate, low-cost, and low environmental impact resource plan. Pursuant to this standard, a gas company must establish that its supply planning process enables it to

(1) identify and evaluate a full range of supply options, and (2) compare all options -- including C&LM -- on an equal footing. Colonial Gas Company, D.P.U. 96-18, at 31; Commonwealth Gas Company, D.P.U. 92-159, at 54; Colonial Gas Company, D.P.U. 93-13, at 51; 1992 Boston Gas Decision, 25 DOMSC at 202.[(8)]

Finally, the Department reviews whether a gas company's five year supply plan minimizes cost. A least-cost supply plan is one that minimizes costs subject to trade-offs with adequacy and environmental impact. Commonwealth Gas Company, D.P.U. 92-159, at 55; Colonial Gas Company, D.P.U. 93-13, at 51-52; 1992 Boston Gas Decision, 25 DOMSC at 203. Here, a gas company must establish that application of its supply planning process has resulted in the addition of resource options that contribute to a least-cost plan.

B. Previous Supply Plan

In its approval of Bay State's last supply plan, the Department directed the Company to address specific issues in its next forecast and supply plan filing. Specifically, Bay State was directed to:

(1) (a) provide a clear description of the maximum resource capability available to serve each division, (b) differentiate between firm and non-firm arrangements, and (c) discuss any supply-related risks if the resources on which it relies are not firm (id. at 52);

(2) document its efforts to compare all resources on an equal basis (id.);

(3) assess current market risks when analyzing decisions, including demand and supply-side risks and the risk of uncertainty associated with long-term decision making (id.); and

(4) demonstrate what steps it has taken to manage pro-actively its resource portfolio to ensure that it is least-cost (id.).

C. Base Case Supply Plan Resources

Bay State's existing portfolio comprises over fifty upstream storage and pipeline capacity contracts and thirteen local production assets (Exh. BSG-1 at 54). Bay State's resources include long-haul transportation of domestic gas supplies from the Gulf Coast, short-haul transportation of Canadian gas supplies purchased at the U.S./Canadian border, short-haul transportation of gas supplies from underground storage facilities, liquified natural gas and propane that is trucked to storage tanks, and peaking resources that provide additional supplies during times of high demand (id. at 54). Bay State states that, because it serves three non-contiguous service areas, it considers the ability of each of its contracted resources to contribute to meeting design day, seasonal, and annual requirements in a particular service area (id. at 55). Bay State identified its resource plan as a "snapshot" in time and explains that it will periodically adjust its strategy in response to future regulatory changes in both the retail and wholesale natural gas markets (id. at 49).

In the following section, the Department reviews the Company's available resources to meet forecasted sendout requirements under design conditions while minimizing costs under normal conditions. The Department's review will focus on Bay State's (1) capacity resources, (2) commodity (gas supply) resources, and (3) Demand Side Management ("DSM") programs.

1. Capacity Resources

The Company's 1999-2000 capacity resources comprise of: (1) long-haul capacity (contracts totaling 98,852 MMBtu per day for design day, and 27,392,580 MMBtu for annual loads); (2) short-haul capacity (contracts totaling 44,969 MMBtu per day for design-day, and 16,413,685 MMBtu for annual loads); (3) storage (51,797 MMBtu for design-day and 8,241,183 MMBtu for annual loads); and (4) peaking resources (341,773 MMBtu per day for design-day and 5,872,750 MMBtu for annual loads) (id. at Schedule BSG-V-1). Bay State indicates that it intends to take advantage of capacity renewal opportunities to re-optimize its portfolio in anticipation of an evolving marketplace (id. at 53).

2. Commodity Resources

Bay State has approximately thirty gas commodity contracts totaling 943,942 MMBtu per day to meet its firm system requirements (id. at Schedule BSG-V-1). According to the Company, approximately half of these gas supply contracts and their associated capacity contracts expire between 1998-2003 (id.). Bay State states that in developing a resource portfolio, it considers the ability of each of its contracted resources to meet design day, seasonal, and annual requirements in each of its three non-contiguous service areas (Exh. BSG-1 at 55). In this regard, Bay State indicates that it has the flexibility to swing some of its pipeline supplies between service territories (id.).

3. Demand Side Management

The Company notes that DSM resources play an important role in Bay State's ability to meet its projected sendout (Company Brief at 20). The Company states that Bay State's movement away from the merchant function provided a strong incentive not to incorporate DSM as a supply resource, but rather, to incorporate DSM in the Company's throughput forecast (Exh. BSG-1, at 21).

D. Adequacy of the Supply Plan

1. Design-Day Adequacy

Bay State presented tables demonstrating that it has sufficient resources to meet design-day requirements for each division during the forecast period (id. at Schedules BSG-V-4 and BSG-V-6).[(9)] Bay State indicated that it will utilize a combination of pipeline resources, upstream storage, and peaking facilities to meet total requirements for the forecast period 1998-1999 through 2002-2003 (id.).

The Department finds that the Company has established that its design-day supply plan is adequate to meet the Company's sendout requirements during the forecast period.

2. Normal- and Design- Year Adequacy

Bay State submitted its supply plan for meeting its forecasted normal- and design-year (base and high case) sendout requirements throughout the forecast period (Exh. BSG-11, at Schedules BSG-V-5, BSG-V-7, BSG-V-16). Bay State has provided the Department with a list of the resources it will use and the maximum resource capabilities for each resource (id.).

Accordingly, the Department finds that the Company has established that its normal- and design-year supply plans are adequate to meet the Company's forecasted sendout through the forecast period.

3. Cold Snap Analysis

The Company did not prepare a cold snap analysis. The Company asserts that the analysis performed for the High Case of its Design-Year Plan, adequately shows that the Company has sufficient resources to meet demand during a prolonged period of cold weather. (Company Brief at 20).

E. Supply Planning Process

1. Standard of Review

The Department has determined that a supply planning process is critical in enabling a utility company to formulate a resource plan that achieves an adequate, least-cost and low environmental impact supply for its customers. D.P.U. 94-14, at 36; D.P.U. 93-13, at 70; 1992 Boston Gas Decision at 223; 1990 Boston Gas Decision at 388. The Department has noted that an appropriate supply planning process provides a gas company with an organized method of analyzing options, making decisions, and re-evaluating decisions in light of changed circumstances. Id. For the Department to determine that a gas company's supply planning

process is appropriate, the process must be fully documented. D.P.U. 93-13, at 70; 1992 Boston Gas Decision at 223; 1987 Berkshire Gas Decision at 84.

The Department's review of a gas company's process for identifying and evaluating resources focuses on whether the company: (1) has a process for compiling a comprehensive array of resource options -- including pipeline supplies, supplemental supplies, DSM, and other resources; (2) has established appropriate criteria for screening and comparing resources within a particular supply category; (3) has a mechanism in place for comparing all resources, including DSM, on an equal basis, i.e., across resource categories, and (4) has a process that as a whole enables the company to achieve an adequate, least-cost, and low environmental impact supply plan. D.P.U. 94-140, at 37; D.P.U. 93-13, at 70; 1992 Boston Gas Decision at 224; 1990 Boston Gas Decision at 54-55.

The Department reviews a gas company's five-year supply plan to determine whether it minimizes cost, subject to trade-offs with adequacy and environmental impact. D.P.U. 94-140, at 37; D.P.U. 93-13, at 88; 1992 Boston Gas Decision at 236; 1987 Boston Gas Decision at 214. A gas company must establish that the application of its supply planning process, including adequate consideration of DSM and consideration of all resource options on an equal basis, has resulted in the addition of resource options that contribute to a least-cost supply plan. D.P.U. 94-140, at 37; D.P.U. 93-13, at 83; 1992 Boston Gas Decision at 233; 1986 Berkshire Decision at 115. As part of this review, the Department requires gas companies to show, at a minimum, that they have completed comprehensive cost studies comparing the costs of a reasonable range of practical supply alternatives prior to selection of major new resources for their supply plans. D.P.U. 94-140, at 37; D.P.U. 93-13, at 89; 1992 Boston Gas Decision at 236; 1986 Gas Generic Order at 100-102.

2. Identification and Evaluation of Resource Options

a. Supply-Side Resources

Bay State indicated that the Company continuously monitors the market and evaluates its options in relation to its existing and expected demand requirements (Exh. BSG-1, at 35). Bay State states that it uses the SENDOUT model to simulate the cost impact of various resources on its total portfolio (id.). According to Bay State, this process permits the Company to review its resource options on a total portfolio cost basis (id.). The Company states that it compares non-price factors, such as supply security and reliability, viability and flexibility, in evaluating resource options (id.). Finally, the Company stated that it groups resource options into categories for evaluation within and across resource groups. These groups are: pipeline supply; interstate transportation; upstream storage; and LNG and supplemental supplies (id. at 37).

b. Assessing Market Risk

The Company indicated that it conducts an analysis of several market risks including: (a) the long-term nature of the contractual commitments associated with capacity resources; (b) the pace and manner in which retail markets unbundle and become competitive; (c) uncertainties concerning the pace of migration;

(d) the wholesale electricity market; and

(e) market supply-related risks including renewal of the capacity to New England on the Tennessee Gas Pipeline in the year 2000 (id. at 38-40).

c. Unbundling-Related Uncertainties on the Planning Process

Bay State contends that the Company's ongoing progress toward unbundling its services including its aggressive small customer pilot programs necessitate changes to the planning process to accommodate the requirements of its customers that migrate to transportation service (id. at 43). Bay State asserts that it continues to have an obligation to serve all customers, including transportation customers who may return to bundled service if they are dissatisfied or their supplier fails (id.). Finally, the Company notes that the suppliers in it service territory do not hold primary capacity rights to Bay State's city-gates (id.). d. Supply-Side Resources

Since its last forecast and supply plan, Bay State has made two significant changes to its resource portfolio as described below.

1. Portland Natural Gas Transmission System Agreement

On June 2, 1995, Bay State entered into an agreement with Portland Natural Gas Transmission System ("PNGTS") to provide 40,600 MMBtu per day of firm, winter-season capacity and an additional 4,900 MMBtu per day of year-round capacity (id. at 57). The PNGTS agreement is a twenty year commitment and Bay State notes that half of this capacity is expected to replace the expiring Portland Pipeline lease agreement (id.). The Company indicated that it considered numerous alternative capacity options to replace the expiring Portland pipeline lease agreement and contends that the PNGTS Agreement was the best option available at the time it needed to contract for replacement capacity (id.;

Exh. D.T.E. 1-16).[(10)] Bay State contends that, with the PNGTS capacity, it will continue to meet its design-day, seasonal, and annual requirements (Exh. BSG-1 at 57). Bay State contends that the PNGTS agreement will enhance the Company's portfolio flexibility and diversity by allowing it to access pipeline and underground storage supplies in the Midwest via TransCanada Pipeline and MCN storage (id.). Further, Bay State argues that the PNGTS Agreement will provide the Company with more flexibility when it renegotiates or declines renewal of expiring capacity contracts (id.).

The Company asserts that its decision to commit to the PNGTS agreement was based on its responsibility to ensure that adequate capacity resources would be available to serve firm loads and allow its markets to continue to grow during the transition to customer choice

(Exh. D.T.E. 1-17). Finally, the Company claims that at the time the PNGTS agreement was executed, project developers required long-term commitments of twenty years or more to demonstrate financial soundness in the investment community (Exh. D.T.E. 1-18).

The Company indicated that its SENDOUT model runs were based on the Company's 1995 decision (Tr. at 73). Further, the Company indicated that through Bay State's pilot program and the Company's participation in the Massachusetts Gas Unbundling Collaborative process, the Company was able to review marketers' expectations regarding the PNGTS capacity (id. at 74).

2. Berkshire Power Agreement

Subsequent to its decision to contract for PNGTS capacity, Bay State planned to terminate its capacity on the Tennessee Gas Pipeline ("TGP") no later than November 1, 2000 (id. at 59). In an effort to maximize the value of TGP capacity up to the expiration date, Bay State entered into an agreement ("Berkshire Agreement") with the developers of the Berkshire Power project ("Berkshire") which calls for the permanent release of 45,000 dth/day of TGP capacity to Berkshire at the maximum tariff rate (id.). Bay State states that the Berkshire Agreement would release capacity to Berkshire from April 1999 until October 31, 2000; the remaining term of Bay State's TGP contract (id. at 58). As part of the Berkshire Agreement, Bay State can recall this capacity up to 720 hours during the winter season to meet its design and peak demand periods (id.). After October

2000, Berkshire is contractually obligated to offer Bay State access to this resource under the same terms and conditions for as long as Berkshire is the primary holder of Tennessee capacity (id.).

e. Demand-Side Management

Bay State asserts that the exclusion of explicit DSM savings adjustments will (1) increase the range of throughput modeled in its high throughput scenario, and (2) avoid the issue of double counting DSM savings in the forecast (id. at 21). The Company also contends that separating the merchant function from transportation provides a strong incentive not to network its sendout model to incorporate DSM in its throughput forecast (id.). Finally, the Company asserts that it has taken a consistent and reasonable approach to comparing DSM and other resource options on an equal basis and, therefore, meets the Department's directive (id. at 22).

f. Consideration of All Resources on an Equal Basis

According to Bay State, the Company's resource planning process allows Bay State to identify a full range of resource options, including DSM, and compare these options on an equal basis, using sophisticated modeling techniques to evaluate the cost of competing options. (Company Brief at 29). Bay State claims that non-cost criteria are evaluated outside of the least cost model (id.) The Company further asserts that it uses this process to secure best cost resource additions (id.)

g. Analysis and Findings

In its 1996 decision, the Department noted that Bay State had demonstrated that it was an active participant in the marketplace for resource options and had pursued innovative resource alternatives, such as peak-shaving agreements, to improve its resource portfolio (Bay State Gas Company, D.P.U. 93-129 (1996)). In the filing under review, the Company has indicated that it has developed a method, using the SENDOUT model, to evaluate alternative resources. In addition, the Company has indicated that in developing its portfolio, Bay State considers the impact of migration to transportation and of unbundling-related uncertainties. Consequently, the Department finds that Bay State has developed a process for identifying a comprehensive array of resource options.

In D.P.U. 93-129, the Department cautioned the Company that long-term commitments for fixed capacity, at a time of volatile load and decreasing sales commitments, appears to impose an added degree of risk and the potential for stranding costs (D.P.U. 93-129, at 46). The Company entered into a 20-year contract with its affiliate PNGTS for delivery of Canadian gas. The Company did not provide the Department with analyses showing the benefits, if any, that would accrue to Bay State's customers as a result of the 20-year PNGTS commitment. Nor is there other evidence to indicate that the Company communicated with participants in its markets to determine whether the 20-year contract for the acquisition of PNGTS capacity would in the public interest. The Department accepts that the Company considered numerous alternative capacity options to replace the

expiring Portland Pipeline lease agreement. Because the use of Bay State's current optimization model was previously approved by the Department in D.P.U. 93-129, the Department approves the process used for resource evaluation. However, two issues fundamental to the PNGTS agreement warrant further investigation: (1) the appropriateness of Bay State's decision to increase its capacity commitments with the PNGTS Agreement at a time when the Massachusetts natural gas market is opening to competitive markets; and (2) the appropriateness of Bay State's decision to enter into a 20-year agreement with PNGTS.

On March 30, 1998, the Department approved the two firm transportation agreements between Bay State and PNGTS noting that our approval of these contracts does not represent a finding of prudence or that the contracts are in the public interest." Bay State Gas Company, D.P.U./D.T.E. 95-128 (1998). The Department therefore directs Bay State to file within 90 days of the issuance of this Order a proposal for review of the contracts by the Department to determine whether the acquisition of the resources is prudent and in the public interest.

Regarding DSM, in D.P.U. 93-129, the Department found that Bay State had not "...complied with conditions to incorporate an evaluation of DSM resources." D.P.U. 93-129 at 43. In that decision, the Department directed the Company to continue its efforts to compare all resource options on an equal footing and directed Bay State to document its efforts in the Company's next forecast and supply plan. (Id. at 44).

The Department remains concerned with the Company's insistence on excluding DSM from its planning process. The Company indicated that it intends to continue to plan for over 70 percent of the capacity flowing into is service territory, regardless of whether the capacity is used to serve sales or transportation customers. Bay State's selectivity is perplexing. The Company appears to apply the changes in the market selectively without establishing a set of common criteria. As a result, the Department finds that Bay State has not considered all resources, including DSM, on an equal basis as directed in the Company's last forecast and supply plan decision. The Department, therefore, finds the Company's Forecast and Supply Plan lacking in this respect, and directs the Company, in its next Forecast and Supply Plan filing, to consider all resource options on an equal footing and document its efforts.

F. Least-Cost Supply

1. Bay State's Least-Cost Analysis

a. Description

Bay State states that it relies upon the SENDOUT model to perform the quantitative aspects of its analysis of alternative portfolio options based on a five-year period (Exh. BSG-1, at 59). Bay State's SENDOUT model has been used to examine its resource portfolio under three throughput scenarios (base, high, and low), and two migration sensitivities (high and low) (id. at 60). Bay State assumes that it will maintain an optimal

portfolio that will serve seventy-five percent of the requirements of its transportation customers (id.).

i. Base Case Throughput Scenario

Bay State's base case scenario assumes a "most likely" forecast of demand. In making this determination, the SENDOUT model indicates (1) whether sufficient capacity exists to meet design requirements; and (2) the optimal amounts of capacity for those selected resources (Exh. BSG-1, at 62). Bay State indicates that it has sufficient resources in its portfolio to satisfy all firm demand needs during the forecast period under design weather conditions (id. at Schedules BSG-V-3, and BSG-V-4).

ii High and Low Throughput Scenarios

As with the base case throughput scenario, Bay State asserts that its SENDOUT model indicates sufficient resources to meet design day and annual demand requirements (id. at Schedules BSG-V-6 through BSG-V-11).

iii. Migration Sensitivity Analysis

In testing SENDOUT's throughput results against the unknown consequences of structural changes in the natural gas industry, Bay State developed the High and Low Migration sensitivity analysis. In this model, Bay State assumes the high throughput scenario as the basis in the Low Migration case, and the low throughput scenario as the basis in the High Migration case (Exh. BSG-1 at 66). Based on these assumptions, Bay State asserts that, in the Low Migration case, all resources are available to Bay State at their maximum capacity. Under the High Migration case, Bay State states that it expects to use only Tennessee storage, and a portion of PNGTS volumes (Exh BSG-1 at 67).

b. Analysis and Findings

Bay State has demonstrated that it has in place processes by which it develops resource planning strategies to maintain reliable, least-cost service to its firm sales customers. The Department therefore finds that Bay State's SENDOUT model allows the Company to identify a variety of capacity and commodity options under multiple planning contingencies and migration scenarios.

The evidence concerning Bay State's planning contingencies and migration scenarios indicates that Bay State can meet the forecasted sendout throughout the forecast period (see Exh. BSG-1, at Schedules BSG-V-3 through BSG-V-14). Based on this, the Department concludes that the Company's supply plans for meeting its forecasted sendout of design-year, design-day, and normal-year to be reviewable, appropriate, and reliable.

The Department notes that the Company failed to include an evaluation of its portfolio under cold-snap conditions. The Company's High Case Design-Year analysis, reflects the conditions considered in a cold snap analysis. Although the Department has found the

Company's analysis to be reviewable, appropriate, and reliable, the Department directs Bay State, in its next filing, to include a cold snap analysis with complete supporting data explaining the allocation and adequacy of resources under cold-snap conditions as required by Administrative Bulletin 86-1, May 1986.

IV. ORDER

Accordingly, after due notice, hearing, and consideration, it is

ORDERED: That Bay State Gas Company's petition for approval of its send out forecast and supply be and hereby is approved; and it is

FURTHER ORDERED: That Bay State Gas Company follow all directives contained herein.

By Order of the Department,

_____

James Connelly, Chairman

_____

W. Robert Keating, Commissioner

_____

Paul B. Vasington, Commissioner

_____ Eugene J. Sullivan, Jr., Commissioner

_____

Deirdre K. Manning, Commissioner

Appeal as to matters of law from any final decision, order or ruling of the Commission may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the Order of the Commission be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Secretary of the Commission within twenty days after the date of service of the decision, order or ruling of the Commission, or within such time as the Commission may allow upon request filed prior to the expiration of twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the Clerk of said Court. (Sec. 5, Chapter 25, G.L. Ter. Ed., as most recently amended by Chapter 485 of the Acts of 1971).

1. A cold-snap is a prolonged series of days at or near design conditions. D.P.U. 93-13, at 66; 1992 Boston Gas Decision at 217; Commonwealth Gas, 17 DOMSC 71, at 137 (1998) ("1998 Commonwealth Gas Decision").

2. A "bend over effect" occurs as the temperature decreases toward 55 EDDs, causing consumption to level off or grow at a slower rate (D.P.U. 93-129, at 8-9).

3. In compliance with the Department's requirement in D.P.U. 93-129 at 52 in (1) (b), the Company compared the resulting estimates of daily sendout with a representative sample of actual sendout during a historic period of time (Exh. BSG-1, at 28-29). In its current filing, Bay State's comparison is based on actual daily firm sendout data and actual EDDs for the period November 1st, 1996 through October 31st, 1997 along with monthly base load and heating increments from the Company's summer 1996 cost of gas adjustment forecast (id. at 29). The results, which are based on the median values of percentage daily differences between forecast and actual firm, indicate an annual difference of

-0.92 % to -2.13% depending on the specific division (id., Schedule BSG-III-14, at 1).

4. The Company stated that it was not sure of the cause of the autocorrelation in its model and for that reason it did not attempt to correct these low statistics (Tr. at 20). However, the Company believes that the problem might have been due to a specification error in its modeling (id.).

5. The migration to transportation service is forecast to increase from 14,603 BBtu in 1998-99 to 36,169 BBtu in 2002-03 (Exh. BSG-1, at Schedule BSG-V-16).

6. G.L. c.164, § 69I also directs the Department to balance cost considerations with environmental impacts in ensuring that the Commonwealth has a necessary supply of energy. Colonial Gas Company, D.P.U. 96-18, at 31; Commonwealth Gas Company, D.P.U. 92-159, at 53; Colonial Gas Company, D.P.U. 93-13, at 50.

7. The Department's review of reliability, another necessary element of a gas company's supply plan, is included within the Department's consideration of adequacy. See Colonial Gas Company, D.P.U. 93-13, at 50, n. 22; 1992 Boston Gas Decision, 25 DOMSC at 201, n. 87; Boston Gas Company, 16 DOMSC 173, at 214 (1987).

8. G.L. c. 164, § 69I, requires a utility company to demonstrate that its long-range forecast "include[s] an adequate consideration of conservation and load management." Initially, the Siting Council reviewed gas C&LM efforts in terms of cost minimization issues. In the 1988 Commonwealth Gas Decision, 17 DOMSC at 122-126, the Siting Council expanded its review to require a gas company to demonstrate that it has reasonably considered C&LM programs as resource options to help ensure that it has adequate supplies to meet projected sendout requirements.

9. The Department notes that Bay State did not provide the standard tables as required by Administrative Bulletin 86-1, May 1986. The Administrative Bulletin 86-1 was issued in conjunction with EFSC 85-64 (1986). The purpose of the decision was "... to make those [forecast and supply plan] reviews more efficient and less burdensome to the companies." Evaluation of Standards and Procedures, 14 DOMSC at 95.

10. Bay State stated that each of the alternative capacity options were evaluated for quantitative soundness, viability, reliability, diversity, and flexibility using Bay State's long-run optimization model (Exh. D.T.E. 1-16).